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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,454	03/08/2004	Yuichi Yagawa	16869B-080600US	2420

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EXAMINER

FARROKH, HASHEM

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 02/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/796,454

Applicant(s)

YAGAWA ET AL.

Examiner

Hashem Farrokh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-26 is/are allowed.
- 6) ☒ Claim(s) 1, 4, 5, 15 and 19-22 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 6-14 and 16-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/30/05</u> . | 6) <input type="checkbox"/> Other: _____ |

The instant application having application No. 10/796,454 has a total of 26 claims pending in the application; there are 7 independent claims and 19 dependent claims, all of which are ready for examination by the examiner.

INFORMATION CONCERNING CLAIMS:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,363,462 B1 to Bergsten.

1. In regard to claim 1 Bergsten teaches:

"A method for copying data to multiple remote sites (e.g., see column 1, lines 36-40), the method comprising: transmitting data from a first volume in a primary storage system to a back-up volume provided in a secondary storage system (e.g., see column 14, lines 38-40; Fig. 16), the primary storage system being located at a primary site and the secondary storage system being located at a first remote site from the primary site;" (e.g., see column 14, lines 38-40; Fig. 16). For example the data packets is transferred for local or primary storage system to remote storage system.

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“copying the data from the first volume in the primary storage system to a second volume in the primary storage system using a point in time (PiT) as a reference point of time for the copying (**e.g., see column 20, lines 21-41; Fig. 32**), the second volume being provided with a first time consistent image of the first volume with respect to the reference point of time;” (**e.g., see column 21, lines 11-14; Fig. 33**). *Figures 32 and 33 shows that the multiple point-in-time copies are being made with reference time (e.g. time-stamp).*

“and transferring the data from the second volume in the primary storage system to a third volume in a ternary storage system at a second remote site (**e.g., see column 16, lines 30-59; Figs. 1 and 21**), the third volume being provided with a second time consistent image of the second volume (**e.g., see column 21, lines 11-14**), which is substantially the same as the first time consistent image.” (**e.g., see column 20, lines 21-41; Fig. 32**). *Bergsten discloses a multiple storage system which is geographically located. Multiple copies of data are made in one of the storage system and transported or transferred to another storage system (e.g., ternary storage system) that requests the transfer. Figure 32 shows copy C (e.g. third volume) which has the same time image of the copy B (e.g., second volume), for example overlapping time.*

2. *In regard to claim 4 Bergsten teaches:*

“wherein the first and second time consistent images are substantially the same.” (**e.g., see column 20, lines 21-41; Fig. 32**). *Figure 32 shows copy C (e.g. third volume)*

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which has the same time image of the copy B (e.g., second volume), for example overlapping time.

3. *In regard to claim 5 Bergsten teaches:*

*“receiving a plurality of data write requests (**column 18, lines 24**) at the primary storage system from a primary host (**elements 2 in Fig. 1**), each of the data write requests having a timestamp and data associated with that write request,” (e.g., see **column 21, lines 11-16; Fig. 33**).*

*“and storing the data write requests in the primary storage system.” (e.g., see **column 21, lines 11-16; Fig. 33**). For example each write request with its associated time-stamp is stored in cache.*

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 15 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergsten in view of U.S. Patent Publication 2004/0260899 A1 to Kern et al (hereinafter Kern).

4. *In regard to claim 15 Bergsten teaches:*

"A method for copying data to a remote site (**e.g., see column 1, lines 36-40**), the method comprising: copying data from a first volume to a second volume to provide the second volume with a first time consistent image with respect to a first given time (**e.g., see; column 20, lines 21-41; Fig. 32**), the first and second volumes being provided in a first storage system;" (**e.g., see column 16, lines 29-32; Fig. 20**). *Bergsten discloses that multiple local copies with associated timestamp are provided in local multiple storage disk (MSD) system each with corresponding timestamp (see Fig. 32).*

"and transferring the data from second volume to a third volume to provide the third volume with a second time consistent image with respect to a second given time (**e.g., see column 14, lines 38-40; Fig. 16**)," *Bergsten teaches that multiple point-in-time copies of data (e.g., volume) are created in local storage system and transferred to multiple remote storage systems. However, Bergsten does not expressly teach: "the third volume being provided in a second storage system that is located at least 10 miles from the first storage system."*

Kern teaches: "the third volume being provided in a second storage system that is located at least 10 miles from the first storage system." (e.g., see paragraph 26 in page 2; paragraph 34 in page 4; Figs. 1 and 3) for transferring the data (e.g., volume) to a remote backup storage system which hundreds or thousands miles away. Disclosures by Kern and Bergsten are analogous because both references teach remote backup storage systems.

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At the time of invention it would have been obvious to a person of ordinary skill in art to modify the storage system taught by Bergsten to include the specified geographically remote storage system disclosed by Kern that is hundreds or thousands miles away. The motivation for using a remote backup storage system as specifies by paragraph 4, page 1 of Kern is to restore or recover data in the event of a sudden catastrophic failures (e.g. such as earthquake).

Therefore, it would have been obvious to combine disclosures by KERN with Bergsten to obtain the invention as specified in the claim.

5. *In regard to claim 19 Bergsten teaches:*

"A computer system (e.g., see column 6, lines 47-63; Fig.3), comprising: a timer to provide a timestamp to data requests;" (e.g., see column 21, line 13). The controller generates time-stamp therefore it inherently comprises a timer.

"an interface configured to form a communication link with a first storage sub-system;" (e.g., see column 4, lines 1-4 and 41-44; Fig.1). For example Fig. 1 shows that communication paths or links for connecting the storage sub-system.

"and a computer storage medium including (e.g., element 11 in Fig. 3): code (e.g., column 7, lines 30-34): for initiating copying of data from a first volume to a second volume to provide the second volume with a first time consistent image with respect to a first given time (e.g., see; column 20, lines 21-41; Fig. 32), the first and second volumes being provided in a first storage sub-system (e.g., see column 16, lines 29-32; Fig. 20), and code for initiating transferring of the data from second volume to a

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third volume to provide the third volume with a second time consistent image with respect to a second given time," (**e.g., see column 14, lines 38-40; Fig. 16**). *Bergsten teaches that multiple point-in-time copies of data (e.g., volume) are created in local storage system and transferred to multiple remote storage systems. However, Bergsten does not expressly teach: "the third volume being provided in a second storage system that is located at least 10 miles from the first storage sub-system."*

*Kern teaches: "the third volume being provided in a second storage system that is located at least 10 miles from the first storage sub-system." (**e.g., see paragraph 26 in page 2; paragraph 34 in page 4; Figs. 1 and 3**) for transferring the data (e.g., volume) to a remote backup storage system which hundreds or thousands miles away. The motivation for combining the teaching of Kern and Bergsten is based on the same rational given for claim 15.*

6. *In regard to claim 20 Bergsten teaches:*

"wherein the computer system is a host coupled to the first storage sub-system or a storage system including a plurality of storage sub-systems provided at multiple sites." (**e.g., see column 3, lines 40-44; Fig. 1**).

7. *In regard to claim 21 Bergsten teaches:*

"A computer readable medium (**e.g., element 11 in Fig. 3**) for use in a storage system (**e.g. Fig. 1**), the medium comprising:"

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“code for copying data from a first volume to a second volume to provide the second volume with a first time consistent image with respect to a first given time (**e.g., see column 20, lines 21-41; Fig. 32**), the first and second volumes being provided in a first storage system;” (**e.g., see column 16, lines 29-32; Fig. 20**).

“and code for transferring the data from second volume to a third volume to provide the third volume with a second time consistent image with respect to a second given time,” (**e.g., see column 14, lines 38-40; Fig. 16**). *Bergsten teaches that multiple point-in-time copies of data (e.g., volume) are created in local storage system and transferred to multiple remote storage systems. However, Bergsten does not expressly teach: “the third volume being provided in a second storage system that is located at least 10 miles from the first storage system.”*

Kern teaches: “the third volume being provided in a second storage system that is located at least 10 miles from the first storage system.” (**e.g., see paragraph 26 in page 2; paragraph 34 in page 4; Figs. 1 and 3**) *for transferring the data (e.g., volume) to a remote backup storage system which hundreds or thousands miles away. The motivation for combining the teaching of Kern and Bergsten is based on the same rational given for claim 15.*

8. *In regard to claim 22 Bergsten teaches:*

“wherein the medium is provided in a host or storage sub-system.” (**e.g., see column 7, lines 34-36; elements 11-12 and 13 in Fig. 16**).

ALLOWABLE SUBJECT MATTER

Claims 23-26 are allowed.

Claims 2-3, 6-14, and 16-18 are objected to as being dependent upon rejected based claims, but would be allowable if rewritten in correct and independent form including all of the limitations of the base claim and any intervening claims.

1. *The primary reason for allowance of claim 2 in instant application is the combination with the inclusion of following limitations: **copying the data from the third volume in the ternary storage system to a fourth volume in the ternary storage system, the fourth volume being provided with a third time consistent image corresponding to the second time consistent image, the third time consistent image being substantially the same as the first time consistent image.***

2. *The primary reason for allowance of claims 3 and 16 in instant application is the combination with the inclusion of following limitations: **wherein the transmitting step involves a synchronous remote copying method, and the transferring step involves an asynchronous remote copying method.***

3. *The primary reason for allowance of claim 3 in instant application is the combination with the inclusion of following limitations: **wherein the transmitting step involves a synchronous remote copying method, and the transferring step involves an asynchronous remote copying method.***

4. *The primary reason for allowance of claims 6-11 in instant application is the combination with the inclusion of following limitations: **wherein the copying step includes: retrieving first timestamp associated with first data; and shadow***

copying the first data from the first volume to the second volume if the first timestamp indicates a time that is prior to the reference point of time.

5. The primary reason for allowance of claims 12-14 in instant application is the combination with the inclusion of following limitations: estimating time required for providing the fourth volume with the third time consistent image using information relating to the an amount of data copied from the first volume to the second volume in a previous copy cycle.

6. The primary reason for allowance of claim 17 in instant application is the combination with the inclusion of following limitations: wherein the receiving step involves a synchronous remote copying method and the transferring step involves an asynchronous remote copying method.

7. The primary reason for allowance of claim 18 in instant application is the combination with the inclusion of following limitations: wherein the transferring step includes transferring the data from the secondary volume to a plurality of ternary volumes to provide each of the ternary volumes with the second time consistent image with respect to the second given time, the ternary volumes being provided in a plurality of secondary storage systems that are located at least 10 miles from the first storage system.

8. The primary reason for allowance of claims 23-24 in instant application is the combination with the inclusion of following limitations: checking a second timestamp of a second data to be copied from the first volume to the second volume; suspending the copy operation if the second timestamp is after the reference

point; and placing the second volume in a Freeze mode to indicate that the second volume includes a point in time (PiT) copy of the first volume.

9. *The primary reason for allowance of claim 25 in instant application is the combination with the inclusion of following limitations: transferring the first data from the third volume in the secondary storage system to a fourth volume in a ternary storage system at a second remote site, wherein the copying step is suspended if the second timestamp of the second data does not satisfy the reference point of time.*

10. *The primary reason for allowance of claim 26 in instant application is the combination with the inclusion of following limitations: checking a second timestamp of a second data to be copied from the first volume to the second and third volumes; and placing the second and third volumes in a Freeze mode to indicate that the second volume includes a point in time (PiT) copy of the first volume if the second timestamp of the second data to be copied from the first volume to the second and third volumes is after the reference point.*

: IMPORTANT NOTE :

*If the applicant should choose to rewrite the independent claims to include the limitations recited in either one of the claims, the applicant is encouraged to **amend the title of the invention** such that it is descriptive of the invention as claimed as required by sec. 606.01 of the MPEP. Furthermore, the **summary of invention** and the **abstract***

*should be amended to bring them into harmony with the allowed claims as required by paragraph 2 of **sec. 1302.01** of the **MPEP**.*

*As allowable subject matter has been indicated, applicant's response must either comply with all formal requirements or specifically traverse each requirement not compiled with. See **37 C.F.R. § 1.111(b)** and **§ 707.07(a)** of the **M.P.E.P.***

Conclusion

The prior art made of record and not relied upon are as follows:

1. U. S. Patent Publication No. 6,578,120 B1 to Crockett et al. describes Synchronization and resynchronization of loosely-coupled copy operations between a primary and a remote secondary DASD volume under concurrent updating.
2. U. S. Patent No. 5,799,322 to Mosher Jr. describes Distributed computer database system - includes remote computer systems which execute updater processes for reading image records in image trials.
3. U. S. Patent No. 6,587,935 B2 to Ofek describes Method and apparatus for mirroring data in a remote data storage system.
4. U. S. Patent No. 6,434,681 B1 to Armangau describes Snapshot copy facility for a data storage system permitting continued host read/write access.

Any inquiry concerning this communication should be directed to Hashem Farrokh whose telephone number is (571) 272-4193. The examiner can normally be reached Monday-Friday from **8:00 AM to 5:00 PM**.

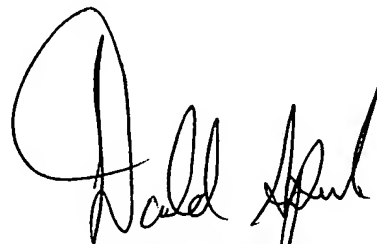
If attempt to reach the above noted Examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Donald A Sparks, can be reached on (571) 272-4201.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either private PAIR or Public PAIR. Status information for unpublished application is available through Private PAIR only. For more information about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBS) at 866-217-9197 (toll-free).

HF.

HF

2006-02-04

A handwritten signature in black ink, appearing to read 'Donald Sparks', is positioned above the printed name and title.

DONALD SPARKS
SUPERVISORY PATENT EXAMINER